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ABSTRACT

One phase of an investigation of the high attrition rate of junior colleges, this study sought to determine whether it is possible to predict, before classes begin, if an entering student will stay through or withdraw during the first semester. Data obtained in Phase One of the study of 653 entering students were augmented with high school test data and parental occupational information. Two data decks--one for persisters and one for withdrawers--were used in the discriminant analysis. The variable, Social Studies Florida Twelfth Grade score, emerged as the most significant in discriminating between persisters and withdrawers. Student status, i.e., full-time or part-time students, was generally second in importance, but was significant in only one of the five analyses, with the full-time student always more likely to persist than his part-time peer. Third in significance was generally race, with blacks less likely to persist than whites or "others." It was found that with the Florida Twelfth Grade excluded, high school rank entered significantly, the student having the better high school standing more likely to persist than one with a lower standing. When all academic data were excluded from the analysis, none of the other variables were significant in discriminating between persisters and dropouts. It was found that the data available would lead to predictions of about 65% accuracy. (DB)

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PREDICTING WHO WILL WITHDRAW DURING THEIR FIRST SEMESTER OF ATTENDANCE AT MIAMI-DADE JUNIOR COLLEGE, SOUTH CAMPUS

MIAMI-DADE JUNIOR COLLEGE

Department of Educational Research
Miami-Dade Junior College, South
Barry Greenberg, Chairman
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JC 730 167

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Barry Greenberg
Melvin Lindsay, Jr.

INTRODUCTION:

One of the most perplexing issues facing higher education and the junior colleges in particular, is the high attrition rate of their clientele. All across the country there is concern over the small percentage of students who complete a course of study. Cohen and Brawer (1970) have reported that attrition is of national concern and that it has averaged near 50% for as long as such studies have been conducted. In fact, in his recently completed nation-wide study of dropouts conducted for the American Council of Education, Alexander Astin concluded that "...the unfilled expectations are the rule rather than the exception among two-year college students." And, he adds later, that the same is true for students at four-year colleges. (Astin, 1972, pp. 13-14.)

At the South Campus of Miami-Dade Junior College concern over withdrawal rates is evidenced in the large number of investigations in the area undertaken in the last several years. This report is itself only a part of a larger investigation initiated in the Fall of 1971. (See, "1971-2 Withdrawal Study Phase One" for a detailed description of rationale and methodology.)

The purpose of this phase of the study is to determine whether it is possible to predict, before classes begin, if an entering student will persist through his first semester or withdraw without receiving any college credits. If such predictions are feasible, it is presumed that the college could intervene, in some manner, to try to alter the course of action for those students predicted to withdraw.

METHODOLOGY

The data obtained in Phaze One of the Withdrawal Study (Where n was 653, 20% of "J"* Fall 1971 students) were augmented with high school test data and parental occupational information. (See Appendix A for a more detailed description of the manner in which occupational data were collected and coded.) Two decks of data were key punched, one for "persisters" (i.e. those who completed their first semester with at least 1 course of credit) and one for "withdrawers" (i.e. those who left during their first semester with no credits earned). The technique used for data treatment was Discriminant Analysis, the purpose of which was to identify those variables which significantly differentiate one group from the other. Variables so identified would be the ones to be used in a prediction equation.

The total array of information collected for each student was as follows:

1. Full time or part-time student (Student Status)
2. Sex
3. Occupation of parent, rank ordered from "1" to "7" using a modification of Warner's scale.
4. Fla. Twelfth Grade Aptitude
5. " " " English
6. " " " Social Studies
7. " " " Natural Science
8. " " " Math
9. " " " Total
10. " " " Aptitude Verbal
11. " " " Aptitude Quantitative
12. " " " Reading Index
13. High School Grade Point Average
14. High School Rank
15. Stanford Achievement Reading - High School
16. Stanford Achievement Mathematics - High School
17. Race (coded for "White", "black" and "other")

If all data were available for all students, then one analysis for all students would suffice for identifying significant variables. But since data could not be obtained for all students

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*All Students attending college for the first time are designated as "J" students.

several "runs" or analyses were required, each containing a different combination of variables. For example, as will be discussed in the results section, run 1 was performed on students for whom 13 of the 17 data elements existed, for run 2, 12 of the 17 data elements existed and so on. The most students included in any run was 385.

LIMITATIONS:

The sample was comprised of "J" South Campus students and generalizations should be considered accordingly. The small number of "withdrawers" for whom data existed (it was available for 42 of the 84 who withdrew) constitutes the most serious limitation of the study, though there is no reason to believe that those for whom data did not exist differ significantly from those included in the study. The small number of black students (5 withdrawers and 17 persisters) included in the analysis leads to the recommendation that findings be construed as tentative and only suggestive of relationships which may or may not be substantiated as the numbers increase. Finally, since occupations were coded in a manner not verified elsewere, discussions relating to the relationship between parental occupation and retention in school must similarly be viewed as being tentative.

RESULTS

Run 1

Out of 244 students for whom appropriate data for this run existed, 21 withdrew before the end of their semester and 223 persisted. The analysis covered the following areas: status (full/time or part/time student), sex, occupation of parent (coded from their high school transcript), Florida Twelfth Grade Test Scores, race. Each of these variables was allowed to enter into a Stepwise Discriminant Analysis designed to indicate which of the variables would be useful for discriminating amongst the groups.

The only variable which proved significant* in discriminating between the groups was the Social Studies section of the Florida Twelfth Grade Test. The means and standard deviations were as follows:

	Dropouts		Persisters	
	Mean	S.D.	Mean	S.D.
Soc. Studies	38.43	27.64	57.97	24.63

The variable, race, entered next (with blacks more likely to drop than whites or "others") followed by parents occupation and FTG Aptitude Quantitative, though, again, each of these and all others except Social Studies were not significant. The means and standard devaitions for persisters and dropouts on race and parental occupation were as follows:

	Dropouts		Persisters	
	Mean	S.D.	Mean	S.D.
Parental Occupation	4.38	1.50	4.39	1.38
Race (black)	.09	.03	.02	.16

* Obtained F = 11.8243, critical F at .01 level with 1 and 242 degrees of freedom is between 6.170 and 6.76.

Though only Social Studies scores entered significantly, persisters outscored dropouts on all FTG measures, as follows:

	MEANS	
	Dropouts	Persisters
F.T.G. Apt.	38.48	55.32
Eng.	37.19	50.57
Nat. Sci.	35.05	52.69
Math.	45.24	55.86
Total	194.38	272.50
Apt. V	38.62	53.07
Apt. Q	42.14	58.50
Read. Index	36.33	53.07

Through the use of an individual's FTG Social Studies score alone, predictions as to whether he would persist or drop during his first semseter of attendance would be "correct" 67% of the time, as follows:

Of the 244 students in this run, use of FTG Social Studies alone would have predicted:

14 to drop who actually dropped
149 to persist who actually persisted
163 "correct" predictions

7 to persist who actually dropped
74 to drop who persisted
81 "errors" of prediction

$\frac{163}{244}$ = 67% correct predictions

Run 2

In this analysis, the parents' occupation information was not utilized thereby increasing the sample size to 378, of whom 42 were withdrawers and 336 persisters. (The number was increased from the first run since for many students parent occupational data were missing.)

Once again Social Studies FTG scores proved the most significant variable for discriminating between the two groups*. But this time a

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*$F=14.2535$, $P < .001$

second variable, whether a student was a full-time or part-time student, also entered significantly.* The means revealed that the full-time student was more likely to persist than his part-time peer. With full-time students coded as "1" and part-time students as "0," the mean for persisters was .797 while for dropouts it was .619. (Thus, given two students with equal Social Studies FTG scores one full-time and one part-time, the part-time student will be more likely to leave during his first semester of attendance.)

The next variable to enter was race, with the means indicating that the black student was more likely to leave than his white peer, but the differences were not significant. With a "1" for black and "0" for others the mean for dropouts was .119 (S.D.=.33) and for persisters was .036 (S.D.=19). Following race and also non-significant were sex (females more likely to drop) and FTG Aptitude.

Using the 2 variables which entered significantly, we could predict:

29 to drop who actually dropped
217 to persist who actually persisted
246 "correct" predictions

13 to persist who actually dropped
119 to drop who persisted
132 "errors" of prediction

246/378 = 65% correct predictions

Run 3

For this analysis, students with high school academic rank data were analyzed, along with the other variables of run 2, excluding Florida Twelfth Grade Scores. There were 385 students included, 36 withdrawers and 349 persisters.

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*$F = 5.46$, $P < .05$

It was discovered that with FTG excluded, student status, that is whether he was a full-time or part-time student, was most significant*. The means revealed that full-time students were more likely to persist than were part-time students.

Also entering significantly was high school rank with the better high school student more likely to persist**. The means were as follows: Dropouts 62%, persisters 51% (Note that the higher the percentage the poorer the students standing, thus 20% represents the top 20% while a rank of 80% would represent only the top 80% and so on.)

Race is close to being a significant factor in this analysis with blacks less likely than whites to persist***.

Using the two significant variables we could predict:

23 to drop who actually dropped
227 to persist who actually persisted
250 "correct" of prediction

13 to persist who dropped
122 to drop who persisted
135 "errors" of prediction

$\frac{250}{385}$ = 65% correct predictions

Run 4

Since high school rank and Social Studies FTG were independently discovered to be significant predictors, this analysis was conducted to determine their usefullness together.

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*F=7.52, $p < .01$

**F=4.995, $p < .05$

***Obtained F=3.70, critical F at .05=3.86.

Of 318 students with both kinds of data and other information already discovered to be significant or close to significant (student status, sex and race) 26 were dropouts and 292 were persisters.

Social Studies F.T.G. entered as the only significant variable in this analysis*. Race was close to being significant with blacks less likely than whites to persist. Student status, high school rank and all others followed with non-significant "F" ratios.

The predictions using Social Studies FTG were as Follows:

17 to drop who actually dropped
191 to persist who actually persisted
208 "correct" predictions

9 to persist who dropped
101 to drop who persisted
110 "errors" of prediction

$\frac{208}{318}$ = 65% correct predictions

Run 5

In this final analysis,** no academic test data were utilized in order to isolate the contribution of parental occupation independent of ability. Included in addition to occupational data were student status, sex and race. There were 284 students with data, 27 withdrawers and 257 persisters.

Parental occupation did enter the analysis first but it was non-significant (F=2.29, critical F between 3.86 and 3.89)

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*F=10.83, P .01

**Not reported here are the details of additional runs which revealed the significance of Stanford Achievement Reading and of Race.

as were all other variables*.

Using parental occupation data the following predications would be made:

26 to drop who actually dropped
36 to persist who persisted
62 "correct" predictions

1 to persist who actually dropped
221 to drop who persisted
222 "errors" of prediction

Since the variable, parental occupation, entered non-significantly the low rate of correct prediction is not surprising. It appears that its use, alone, would result in forecasting failure for many who would succeed. (Of the 257 who persisted only 36 would have been predicted to have done so on the basis of knowledge of their parent's occupation alone.)

Conclusions

The variable, Social Studies F.T.G. score, emerged as the most significant to use to discriminate between persisters and withdrawers. Student status, that is whether he was a full-time or part-time student, was generally second in importance, but significant in only one of the analyses with the full-time student always more likely to persist than his part-time peer.

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*This run provides an interesting contrast with run 3 which revealed student status as a significant variable. In run 3, parental occupation was excluded. Run 5, of course, included parental occupation and did not result in student status emerging as a significant variable. Thus, knowledge of parental occupation negates the need for student status data (as in runs 1 and 5) and eliminating information on parental occupation causes student status data to emerge as a significant variable (as in runs 2 and 3).

Third in significance was generally race, with blacks less likely to persist than whites or "others."

It was found that with FTG excluded, high school rank entered significantly, with the student having the better high school standing more likely to persist than one with a lower standing.

When all academic data were excluded from the analysis, none of the remaining variables were significant in discriminating between persisters and dropouts.

As to our ability to predict an entering freshman's chances of completing his first semester at M-DJC, it was found that the data we have on hand would lead to predictions of about 65% accuracy. Thus, given background data as discussed in this report we could identify, before the semester begins, roughly 2 of every 3 students who will not complete the semester.* They will "tend" to have lower Social Studies FTG scores, be part-time students and to be black.

While ability is clearly the key factor in discriminating between persisters and withdrawers, the size of the standard deviation suggests, as does the percent of correct predictions, that there will be students with high scores who drop and vice versa. In a similar vein, the extreme size of the standard deviation for blacks suggests that racial factors alone, or in combination with ability, are insufficient for prediction purposes. That race does enter as the next most significant variable following ability in run 1, does suggest, however, that the reason for the higher tendency for blacks to drop is not related solely to ability. This finding as well as the findings of no relationship between parental occupation and retention in school, and, possibly, the finding of a relationship between student status and retention in school parallel Astin's findings. (1972, pg. 37, 39, 41)

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*A northern California Consortium of Junior Colleges (Nor Cal) using a specially prepared questionnaire, reported that they were able to make "correct" withdrawal predictions in 7 of 10 cases. Personal communication from Walter L. Brooks, Chairman of the Nor Cal Research Group, March 23, 1972

A final comment on the lack of a relationship between parental occupation and persistence at M-DJC may be in order. On the one hand, the gross manner of coding occupations which was employed in this study may have resulted in the masking of a true relationship between parental occupation and retention in school. On the other hand, since Miami-Dade is appealing to many of the children of those who have never before attended college*, it may be, that the absence of a relationship between parental occupation and persistence should be regarded as a most positive outcome. It may be, in short, that at Miami-Dade those from less prestigious backgrounds have as good a chance of success as all others.

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*Questionnaires administered to a random sample of the Fall, 1970 and Fall, 1971 entering Freshman classes reveal that more than half are from families in which neither parent ever attended college.

Implications

The goal of generating a prediction equation has been reached although its use would result in the improper labeling of many students. The value of utilizing this tool must now be weighed against the consideration that if it was applied to the entire population of newly entering students several hundred who would actually "persist" would be labeled potential dropouts. Time spent by counselors for the purpose of preventing this particular group from dropping out could be considered as wasted, although, to be sure, other positive benefits might derive from these contacts.

There appears to be a need to carefully explore the benefits and costs of this method particularly as they relate to the goals of the College. If, for example, decreasing the number of dropouts has a very high priority, the shortcoming discussed above may be a cost worth paying. The college may, on the other hand, with other objectives in mind consider such an expenditure more appropriate for recruiting new students. Hopefully, the data contained in this report, and in those to follow, will lend objectively to the discussions on strategies to use.

References

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(6) Warner, W. Lloyd Social Class in America New York: Harper, 1960

APPENDIX A

It was necessary to retrieve each student's high school transcript from the files in order to obtain his Stanford Achievement scores, his grade point average and his parents' occupation. Occupational titles were then sorted into categories, roughly along lines suggested by Warner (1960). Seven categories were utilized, along a "1" - "7" continuum with "7" designating the most prestigious occuaption and "1" the least prestigious, as follows:

7

Pilot
Judge
Physician
Lawyer

6

Optometrist
Engineer
Manufacturer
Financial Executive
Business Administrator
Weather Forecaster
Banker
Chemist
Executive
Stock Broker
Minister of Education
Horticulturist
Rabbi
Journalist

5

Salesman
Teacher
Accountant
Manager
Contractor
Air Force (Radar)
Photographer
Revenue Officer
Realtor
Public Relations Director
Pharmacist
Program Director
PAA Traffic Manager
Exporter

4

Clerk
Clothing Salesman
Grocer
Butcher
Shop Foreman
Vender
Jeweler
Printer

APPENDIX A (cont'd)

3

Mechanic
Large Farm Foreman
Cab Driver
Plumber
Sextan
Policeman
Masseur
Carpenter
Chef
Cable Splicer
Machinist
Barber

2

Gas Station Attendant
Truck Driver
Factory Worker
Oiler
Auto Trimmer
Cement Finisher
Steam Fitter
Grave Foreman

1

Busboy
Janitor
Porter
Park Cars
Laborer

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